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Twelve years of ISG masterclasses: Past, Present, and Future

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Twelve years of ISG masterclasses: Past, Present, and Future

Introduction

In this article we discuss the twelve years of the masterclasses organised by the International Society of Gerontechnology (ISG). We first give some of the background to the discipline of Gerontechnology and the ISG. We include an overview of the program itself and the history of its development. In addition, we outline some of the key strategies and lessons that are taught to the masterclass attendees, including the skills that are critical for these students to become the future leaders in the Gerontechnology field. Finally, this paper presents a discussion of how the masterclass and its concepts should be updated in order to keep up with the rapidly changing pace of technology and the needs of older adults (and those who provide support and care).

Gerontechnology

Gerontechnology as a discipline started in the 1990s in the Netherlands. At the Eindhoven University of Technology, research addressed the links between the design and creation of technical products to the basic and applied science of ageing – Gerontology (Fozard & Kearns, 2015). The key disciplines considered to be the sciences underpinning technology were: (1) electrical and mechanical engineering, (2) ICT, (3) physics, (4) chemistry, and those underlying Gerontology, were: (1) psychology, (2) biology, (3) sociology, and (4) geriatric medicine.

However, universities have been slow to adopt a discipline that involves the synthesis of many different subject areas. Even more difficult has been the collaboration with industry and private enterprise to produce viable products; the experiences of two countries in Europe have not been encouraging. In 1999, Finland started a new national programme on ageing funded by the Academy of Finland. Jan Graafmans, one of the creators of Gerontechnology was invited to assess the state of academic research in the field of technology and ageing. His assessment provided a good overview of the Finnish research and its challenges, which likely typifies the circumstances worldwide. The Finnish research groups were small and scattered over the vast, thinly populated country, and did not cooperate with scientists with similar research interests, resulting in few publications. The providers of technology were very small businesses, often enterprises run by a single individual (Academy of Finland, 2003).

In the Netherlands at Eindhoven University of Technology, the cradle of Gerontechnology, the developments faced some setbacks. When Professor Herman Bouma retired, the entire Gerontechnology programme was cancelled (Fozard & Kearns, 2015).

The research programmes of the European Union from the first Framework Programme (1984-1987) have stressed the importance of collaboration with SME and larger enterprises, however this has been a slow learning process for many academicians. The documentation of projects and innovations were not as systematic as they should have been. It appears research protocols in the technical world were not as strict as those in the medical and social sciences.

The International Society of Gerontechnology

The International Society of Gerontechnology (ISG) was formed in 1996 to create an arena for scientists to meet and discuss and share their views with designers and producers of technological products (Fozard & Kearns, 2015). The establishment of its own peer reviewed journal – Gerontechnology – was a landmark for the organization.

In early years (i.e., 1996, 1999, 2002), ISG conferences were hosted tri-annually, whereas in the years that followed, the conference was hosted biannually. In 2006 the first master class took place. This was designed for students to study intensively for two days with a group of academics who were specialists in the various disciplines involved – masters.

In May 2018 the ISG was held in St Petersburg, Florida, USA, followed by a two-day masterclass. During this event the students and masters decided that it would be a valuable initiative to have a fresh look at all aspects of the masterclass, and offer insight into areas that could use updating. For example, the widespread use of the Internet has happened. As one student put it, 'I enjoyed the masterclass, but it needs a face lift to breathe new life into the students and their developing ideas'. Comments by both masters and students were collected at the end of the masterclass, and it was agreed that a systematic examination of the responses would be useful.

In this article, we look at the background of the masterclasses, the format and topics of the classes, the links between topics in each discipline, membership, and practical issues. This article will also highlight some potential avenues for revising the masterclass format and exercises (see Tables 1-3), with feedback from masters and masterclass participants.

The masterclasses

The purpose

The origins of Gerontechnology masterclasses may be traced to schooling in the fine arts, where young players would play a piece followed by a critique by a professional musician, or master. The purpose of the masterclasses is to supplement, and not to replace, the usual academic supervision given to graduate students and postdoctoral fellows (Bronswijk, 2014). Indeed, the projects brought to the masterclass must have the approval of the participants' supervisors. Additionally, one of the benefits of the class is the emphasis of interdisciplinary collaborations between participants, which can sometimes be lacking in academic settings.

The format and topics of the classes

The masterclasses take place over a two-day span. In 2018, this was similar to other years. Students accepted into the masterclass were expected to produce a poster, which summarised their research to present to fellow classmates and Masters. Over the two days, students were asked to consider how their research fit into matrices outlined in a series of articles (Bronswijk, 2014; Fozard & Wahl, 2012).

At the end of the first day of the masterclass, an informal evening gathering is often held, and this is greatly appreciated by all as a means of becoming acquainted. Overall, the increase in informality helped break down barriers between students and masters.

Membership

The original masterclass began with undergraduate and postgraduate students. Eventually this evolved to include solely postgraduate students. Postgraduate students in graduate school were encouraged to focus on their doctoral research topics, and postdoctoral students were encouraged to focus on an idea for a grant submission. The 2010 Vancouver masterclasses were marketed towards 'young scientists', however 'young' researchers are no longer explicitly targeted as the term conveys an ageist assumption; many doctoral students are now well above traditional age.

The masters are experienced researchers, most of whom have been officially elected as Masters by the ISG, with an aim to have a mix of disciplines. Masters originally were from disciplines such as Medicine, Psychology and Sociology, but now, Masters include those with expertise in Social Policy and Engineering.

The 2018 ISG Masterclass was composed of: five Masters, six graduate students with Master's degrees, and one postdoctoral fellow. Masters in 2018, as in other years, varied in both geographic affiliation (e.g., US, Canada, UK, Finland) and Gerontechnology expertise (e.g., fall detection/prediction, occupational therapy, robotics). Students similarly varied in geographical distribution (e.g., US, Canada, Brazil, UK) and area of study (e.g., dementia-related wandering, medication errors).

The links between the disciplines and topics

Those who organised the first masterclasses started with the three goals of public health – primary, secondary and tertiary prevention, in addition to a goal of enhancement. Primary prevention may delay and sometimes prevent chronic diseases; secondary prevention can ameliorate the effects of the illness, while tertiary prevention aims to improve the older adult's quality of life in the disease state. The aim was to relate technology to these goals which were central to the study of human ageing and geriatric medicine. This initial focus on the relationship between the goals of Gerontechnology and public health, came at a time where technology development did not stem from a systematic approach. For example, around this time, universal design was considered the silver-bullet for technology use problems in older adults.

The first Matrix was The Science Cross Fertilisation Matrix (Bouma, Fozard, Bouwhuis, & Taipale, 2007) (see Table 1). The Gerontology subjects are Physiology/Nutrition, Psychology, Sociology/Demography, Medicine/Nursing/Rehabilitation. The Technology subjects are Biophysics/Biochemistry, Computer Science/ICT, Mechatronics/Robotics, Ergonomics/Design, Architecture/Construction, and Business Management/Economics.

Table 1: Science-Cross Fertilization Matrix

Gerontology	Technology					
	Biophysics Biochemistry	**Computer Science ICT**	**Mechatronics Robotics**	**Ergonomics Design**	**Architecture Construction**	**Business Management Economics**
Physiology Nutrition						
Psychology						
Sociology Demographics						
Medicine Nursing Rehab						
Notes						

The second matrix was Engineering-Goal and Application Matrix (see Table 2). Goals are Enrichment/Satisfaction, Prevention/Engagement, Compensation/Substitution and Care/Care Organisation. The Application Domains are Health, Self Esteem, Housing/Daily Living, Communication/Governance, Mobility/Transport and Work/Leisure (Bronswijk, Bouma, & Fozard, 2002).

Table 2: Engineering-Goal and Application Matrix

Goal of Technology	Application Domain				
	Health Self-Esteem	**Housing Daily Living**	**Communication Governance**	**Mobility Transport**	**Work & Leisure**
Enrichment Satisfaction					
Prevention Engagement					
Compensation Substitution					
Care and Care Organization					

The third Matrix was Outlook-Age and Generation Matrix (see Table 3). The Technology Generation was Mechanical/Hierarchical Organisation, Electro-Mechanical Organisation, Menu Driven, Layered Software, and Gaming with Proficiency level/Relational Organisation

(Bronswijk, 2014). The Target population Categories were Formative, Main working, Active Retirement, Frailty Needs Help, and Multiple Groups.

Table 3: Outlook-Age and Generation Matrix

Technology Generation	**Target Population Category**				
	Formative	**Main Working**	**Active Retirement**	**Frailty Needs Help**	**Multiple Groups**
Mechanical-Hierarchical Organization					
Electro-Mechanical Organization					
Menu driven, Layered Software					
Gaming with Proficiency level Relational Organization					

Students were invited to place their research topics into these matrices, at one intersection, and later to consider whether its categorization was still appropriate after discussion. One student said that the process of choosing just one intersection at which to place their project was challenging, but helpful for narrowing the focus of the project and seeing how it fits within the field of Gerontechnology. Others stated, that updating the terminology for the matrices was also quite challenging.

Student Reflections

Overall the students both enjoyed and gained a great deal from the masterclass. One said 'The 'reflections' proposed in the activities enabled me to have a new vision of aspects of my projects so that, if they cannot be allocated in my current study, will certainly be used and considered for the future'. Another said 'The masterclass was, for me, a moment of immense learning both with the masters and the pupils. The exchange of experience with the professionals in various areas was enriching professionally and personally'.

Future Directions for ISG Masterclasses

The format of the masterclasses has stood the test of time, however, in the following sections, we make several suggestions on how to improve them. Our hope is to initiate a dialogue with the field towards the aim of improving the value students can extract from future masterclasses.

Agreement in Terminology

Agreement on terminology early on in the masterclass can be important for having productive discussions. When researchers adopt differing definitions, time may be lost in nuanced discussions, detracting from the overall focus of a given masterclass topic (although these nuanced discussions themselves are an important learning tool).

The group acknowledged that agreement on the definition of 'Assistive Technology' would be helpful to better facilitate discussions. A definition focusing on disabilities was not always helpful as it was felt it often precludes many potential users, such as caregivers and health providers (Cook & Polgar, 2015). Furthermore, many older adults do not identify themselves as having a disability in the classic sense that disability has been defined. The World Health Organisation (WHO) definition of "Assistive Technology" should be considered: 'An umbrella term for any device or system that allows the individual to perform a task they would otherwise be unable to do or increases the ease and safety with which tasks can be performed' (WHO, 2004).

Increasing Emphasis on Key Topics

The 2018 masterclass was the first to have a dedicated session on ethics, and it was agreed that more emphasis should be given to this important topic. During discussions it was agreed that many ethics committees have a limited understanding of assistive technology.

Other important subjects for the future include: (1) dementia and problems of wandering (a topic coming into greater prominence); (2) how to gain funding for technology development; (3) how to market emerging technologies; (4) field evaluation of new technologies; (5) service robots; and (5) unintended consequences such as the disabling aspects of Assistive Technologies (AT), e.g. when an older person would prefer to activate something without the intervention of a device, such as turning off a light in the home without Amazon Echo.

Revision of Materials

Following the St. Petersburg 2018 masterclass, the masters and students agreed that the wording of some of the guidance and tables was difficult to follow. Masters and students also agreed that several areas could be more explicitly integrated into the matrices, including, but not limited to, key technology advances such as, "Artificial Intelligence", "Robotics" and "Cloud-based and Mobile Computing", and higher-level topics such as, "Social Policy", "Social Isolation", "Surveillance" and "Engineering". It was also discussed that both formal and informal caregivers should be a *Target Audience* added throughout the matrices.

Some initial directions for potential modifications can include, for example, modifying the heading in Table 2, from "Communication/Governance", to: "Communication/Governance/Social Policy". Furthermore, new and emerging topics should include social isolation and the role of technology in ameliorating isolation in older persons. This topic could fit into Table 2, under the Goal of Technology heading, as "Reducing Social Isolation", or under the Application Domain heading, as "Social Isolation".

Revision of Protocols

Practical issues. The guidance developed by the Masters for the students should be followed in the masterclass. For example, in 2018, the students were told that they would exchange proposals and could comment on them in advance of the masterclass. For future masterclasses, this collaboration could be encouraged through the use of Cloud services like Google Drive or Dropbox. Doing so, would also allow for archiving of past materials for further broadening the institutional knowledgebase of ISG masterclasses.

Renewal of expertise. From an institutional knowledge perspective, keeping a consistent roster of Masters throughout the years, has been quite valuable. But with the emergence of new technologies (e.g., augmented reality), and changes in technology and research trends, the protocol for including new Masters should be adapted. Depending on the topic areas of student applications to the masterclass, one can consider the possibility of calling on new ad-hoc Masters, familiar with the emerging research area (e.g., service robots), to supplement the existing group of traditionally-initiated Masters.

Program evaluation. During the 2018 class, a student mentioned how they would like to be followed up with in years following the masterclass. This feedback mechanism can help to establish observable benefits from partaking in the ISG masterclass while also keeping the dialogue open between students and masters. In terms of establishing benefits, it is important to first establish metrics to track year-to-year. For example, masters may be interested in whether or not the student is still pursuing the same line of research, or if the student has secured any funding related to the idea workshopped during the masterclass.

The Vision: ISG Masterclasses of Tomorrow

We do not provide a finalized set of revised materials and protocols here but encourage the creation of a much-needed working group to further discuss and implement changes to these matrices and other materials. This should include, if possible, those masters who originally devised the various materials used for the masterclasses.

We envision the masterclass of the future as being an in-person continuation of active, year-round, online discussions with masterclass participants of years past. This could be a place for masters and students to engage in conversations of trending topics and discuss progress on projects related to a masterclass. Past masterclass students may even have the capability to play a mentor role to incoming students or serve as initial reviewers for applications. All this, and more is possible --- we just need your help.

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